

collection had been distributed and described by the experts, the account of the arthropod fauna would not have been available until the present interest of Funafuti had passed.

OUR BOOK SHELF.

Weather Lore. A Collection of Proverbs, Sayings and Rules concerning the Weather. By Richard Inwards, F.R.A.S. Third edition. (London: Elliot Stock, 1898.)

MR. INWARDS is to be congratulated on the fact that his industry, exhibited in the collection of quaint sayings concerning the weather, has been rewarded by the demand for a third edition of his book on weather lore. If this popularity indicates a greater taste for an acquaintance with unscientific rules to be applied for the purposes of weather prediction over long periods, than an appreciation for the forecasts made on sound principles but for shorter intervals, it would imply a retrograde movement in meteorological education; but we imagine the demand for the book arises rather from the curious information it contains, and the old-world wisdom it exhibits, than from its scientific teaching and character of guide to weather prophecy. This edition is apparently much increased in size, and some features of a distinctly scientific value have been added. We notice a frontispiece in which the typical forms of cloud are well illustrated, and the average height at which these clouds float is marked by the marginal introduction of well-known mountain summits, calculated to bring home to us a correct notion of the elevation at which these clouds circulate. Cloud study is deserving of much more attention than it generally receives, and we welcome any attempt to induce more regular examination of the forms and motions of the familiar spectacle clouds present.

Then the section on the average dates for the first flowering of plants and appearance of migratory birds, which is either new or has been enlarged, should lead to more accurate observation of familiar phenomena. Such sections interest us much more than the proverbs and sayings which go to make up the bulk of the book. The arrangement of these proverbs seems to be much the same as in the first edition. Of the value of these, apart from their literary character, perhaps it is as well to say nothing. We follow the author or compiler in calling these rules proverbs, but the term is scarcely a happy one. A proverb has been defined as the wisdom of many and the wit of one, but in some cases, here preserved, it is difficult to recognise either the wit or the wisdom. They may give some evidence of national customs or of local manners, and sometimes display shrewd observance on the part of the authors; but this mass of endless detail, collected by many generations of weather-wise people, may become somewhat wearisome if taken in large doses. Yet, if we understand Mr. Inwards correctly, he implies that the persevering labour and continuous observation bestowed on weather signs have resulted in securing some insight into meteorological phenomena, and he recommends us to imbibe the general spirit of these rules and adages, and try to find where similar results have followed similar indications. This would lead to the detection of a number of coincidences no doubt, but it is not easy to see how true science would be advanced thereby.

First Stage Magnetism and Electricity. (The Organised Science Series.) By R. H. Jude, M.A., D.Sc. Pp. 350 + xv. (London: W. B. Clive, 1898.)

ALTHOUGH there are several books on these subjects prepared specially to cover the syllabus of the elementary examination of the Science and Art Department, the one before us has some peculiarities which renders the treatment different in many respects. The chief

difficulty which the author has attempted to overcome is the conception of electrical potential, which so often forms a stumbling-block to the beginner. This he has introduced much earlier than usual, leading appropriately up to it. In this, the first part of the book, the author has further expounded in a simple manner the conceptions of the ethereal theory, thus bringing it within reach of the beginner. The second two parts deal with magnetism and electrodynamics, the main points of treatment being the emphasis of fundamental principles, the omission of the disputed points in the theory of the voltaic cell, and, as the author states, "a liberal use of the conception of potential gradient." Numerous illustrations are inserted in the text, and a great number of examples and examination questions are added.

As a first course on magnetism and electricity the book should prove serviceable.

Problems of Nature. Researches and Discoveries of Gustav Jaeger, M.D. Selected from his published Writings. Edited and translated by Henry G. Schlichter, D.Sc. Pp. ii + 261. (London: Williams and Norgate, 1897.)

THIS small volume has been formed by collecting together a number of Jaeger's brief essays on various important subjects. They are classified under three headings as Zoological, Anthropological, and Varia. The essays are highly ambitious, and lay down the law upon matters of the deepest difficulty with commendable brevity. Thus the fourteen zoological essays range from "The Origin and Development of the First Organisms" and "The Origin of Species" to "Inheritance," "The Animal Soul," and "The Development of the Vertebrate Type," and altogether occupy eighty-three pages. The essays classed as anthropological deal chiefly with the author's pronounced views on physiological processes, infection, immunity, constitutional strength, &c.

The author is apparently a man with an active original mind and a great respect for his own opinion. Subjects of such intricacy and difficulty are not to be handled so boldly except by those who have not been able to study, or have not cared to study all that has been said about them. Allowing for the dictatorial and peremptory style of the author, much that is suggestive and interesting will be found in many of the essays, as indeed we should expect from the writings of a man who was one of the first, if not the first, to suggest the continuity of the substance of the germ cells of parent and offspring as the biological basis of heredity. A letter, written to the author by Charles Darwin in 1869, and a second in 1875, are printed, and the latter also reproduced in facsimile. Both are very characteristic in their high appreciation of the work of another.

The book is well translated and edited. The printing is good, but the few illustrations are not well executed, the representation of a nerve-cell (after Max Schultze) on p. 9 being especially bad.

E. B. P.

Medical Missions in their Relation to Oxford. By Sir Henry W. Acland, Bart., K.C.B., F.R.S. Pp. 92. (London: Henry Frowde, 1898.)

THIS is an address, with a series of notes, delivered by Sir Henry Acland to the Oxford University Junior Scientific Club at the beginning of last December, with the object of showing the valuable work which can be accomplished by men with scientific knowledge acting in connection with foreign missions, either as coadjutors or as appointed religious teachers, as medical practitioners, or as health officers. The needs of India for such men are especially referred to, and it is shown that the prevention of disease, or the care of the public health among various races under different conditions of climate, life, and character, as well as the treatment of disease under the same conditions, should be an essential object of foreign missions. The establishment at Oxford of a

department where the complicated subjects bearing on the public health of India can be taught is warmly advocated.

It was with the idea of securing such means of study that Sir Henry Acland resigned his office into the hands of the Regius Professor of Medicine, Prof. Burdon-Sanderson, but, unfortunately, the University is not able to carry out the scheme, and it remains for some wealthy person to grasp the great importance of the various questions involved in the public health of India, and assist the University to provide the means required.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

Protective Mimicry.

I HAVE read, with special interest, both Sir George Hampson's remarks on certain cases of pseudo-mimicry and Mr. Ed. Poulton's answer to the same (NATURE, vol. lvii. pp. 364 and 389).

Now, as I am the person that was consulted on the subject by one of Sir G. Hampson's correspondents in India, I think myself entitled, and in a way even bound, as far as possible to remove some of the misgivings that seem to have crept into Mr. Poulton's appreciation as to the true bearing of the facts under discussion.

Though he agrees, on the one hand, with Sir G. Hampson as to the fact that "this and other like cases of mimicry are quite destructive of any interpretation of resemblance based on Bates' theory," he yet maintains, on the other, that "they do not similarly affect the Müllerian theory."

But this is precisely what I contend is contradicted by the facts in question. To make this clear, I shall only use Mr. Poulton's own statements and admissions.

"The Müllerian theory," he says, "supposes that a common type of appearance among distasteful insects in the same locality acts as a common advertisement to enemies, so that the loss of life which must ensue during the time in which each generation of enemies is being educated to avoid the owners of a particular type or pattern and colouring is shared between the species instead of being borne by each independently."

The theory, thus understood, seems to Mr. Poulton to be rather exemplified and confirmed than contradicted by the facts in question, and he therefore continues: "It is probable that *Teracoli* are on the whole avoided by birds; and if this is also true of the *Abraxas*, the resemblance may well be advantageous, in spite of the difference in station, even granting that the 'good round sum' of 6000 feet is an absolute barrier to the *Teracoli* below and the *Abraxas* above. But future investigation may show that they approach much nearer than this."

First of all this reasoning, which is openly all about admitted facts, looks rather as a running away from those facts to some wished-for possibilities. Besides Mr. Poulton grants, after all, that unless both types occur in the same locality and be exposed to the same enemies, no possible training of young birds can be conceived, and consequently no advantage can be supposed to accrue.

But what are the facts? For here, of course, I do not pretend to discuss what might take place in any possible supposition, nor even to find fault with the logical slip so very common among natural selection evolutionists, which consists in so confounding the simple admission that similarity of colour exists, or even is useful, as to conclude from it that it is therefore the result of usefulness.

Now, so long as we keep to facts, whether we consider the two species of butterflies themselves or their respective enemies, the conclusion is the same, and they both require distinct climatic conditions and distinct "habitats."

Willingly or not, we must resign ourselves to see the "good round sum" of 6000 feet, or rather the difference in climatic conditions and other "surroundings" represented by this difference in elevation in our regions of Southern India remain as an insuperable barrier between the above-named species of butterflies, and to much the same extent also between their enemies.

Far from coming into contact, therefore, they are thus kept by their habits apart from one another, and put under conditions quite different from those required for the possible application of even the Müllerian theory.

Finally, both from the evidence of these and many like facts and, as Mr. Plateau has so well demonstrated, from the trifling importance of colouring in the selection of insects by their enemies, it is, to say the least, difficult to see how the facts of similarity in colour, shape, &c.—which for shortness sake we may even call "mimicry"—can be interpreted or explained by any possible theory based on simple natural selection. And I would, in conclusion, remark that I distrust all such theories not, as Mr. Poulton seems to believe, "on the ground that the evidence is not demonstrative," but because, far from offering an intelligible and possible explanation of facts, they simply stand in contradiction with them and mislead us as to their real meaning.

J. CASTETS, S.J.

St. Joseph's College, Trichinopoly, India, June 8.

I DO not propose to deal with Mr. Castets' objections to natural selection in general. They have often been met before. As to the special case under discussion, he feels that his knowledge of the distribution of the two species is exhaustive enough to give him safe warrant for the assertion that they are invariably separated by a height of 6000 feet. If this conclusion is well founded, it is an important contribution to the facts of the case under discussion. Nevertheless neither this nor the climatic differences need affect the Müllerian theory if the barrier which separates the one form from the other is crossed by the enemies of both. The *Teracoli*-like appearance of the moth is remarkable, and separates it very sharply from its allies. It occurs on an elevated district surrounded by lower country in which the *Teracoli* abounds. The approximation is sufficient to render the Müllerian theory a probable explanation in view of the immense number of similar relationships accompanying a closer approximation in other parts of the world, and considering the complete absence of any other explanation; unless, indeed, Mr. Castets intends to imply, by so constantly dwelling upon one aspect of the environment, that the difference in climate is responsible for the agreement in appearance.

Oxford, June 30.

E. B. POULTON.

Epidemics among Mice.

REFERRING to a paragraph in your issue of June 23 (p. 179), relative to the discovery by Dr. Issatschenko of a new microbe pathogenic to rats, I would call attention to some articles by Prof. F. Loeffler on epidemics among mice, &c., in the *Centralblatt für Bacteriologie und Parasitenkunde*, Band xi. pp. 129-141 (February 10, 1892), and Band xii. pp. 1-17 (July 5, 1892), which will be found translated in a Blue Book entitled, "Report of the Departmental Committee appointed by the Board of Agriculture to inquire into a Plague of Field-Voles in Scotland, with Minutes of Evidence and Appendices and a copy of the Minute appointing the Committee" (1893). Translations of the above papers form Appendix vi. of this Report; and Prof. Loeffler's second paper relates his successful efforts to employ the "*Bacillus typhi murium*" to destroy field-voles in Thessaly.

It would be interesting to know whether the microbe discovered by Dr. Issatschenko is the same as that described by Prof. Loeffler, or a different species.

W. F. KIRBY.

Chiswick, June 25.

Remarkable Hailstones.

ON Sunday, June 26, a district to the south of Manchester was visited by a thunderstorm, which was remarkable for its accompaniment of heavy hail. The storm came from the same quarter as the cool surface wind, viz. north-east, and reached its height about 2.15 p.m.

Preceded by a lull in the heavy rain, hail, accompanied by lightning, began to fall, and continued to do so for five minutes.

The most noticeable fact was the peculiar shape of the hailstones. These were conical in shape, about $\frac{1}{2}$ inch long, and $\frac{3}{8}$ broad in widest part. In longitudinal section they showed (a) opaque white bands; (b) clear, colourless bands; (c) semi-opaque bands, dotted with more opaque portions.

All of those examined agreed in possessing transparent portions at the vertex and base. On making a transverse section through one of the opaque bands, it was seen to consist of (a) narrow clear channels intersecting the surface; (b) opaque